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COMPARATIVE COST ANALYSIS
OF INCREASING REGISTERED NURSING STAFF
ON THE LABOR AND DELIVERY UNIT AT THE
NATIONAL NAVAL MEDICAL CENTER

A Graduate Management Project
Submitted to the Faculty of
Baylor University
In Partial Fulfillment of the
requirements for the Degree
of
Master of Health Administration
by
Lieutenant Commander Rodney L. Fierek
Nurse Corps, United States Navy

July 1991

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Abstract

This paper examines the comparative costs of increasing the number of Labor and Delivery registered nurses at the National Naval Medical Center (NNMC) with staff from one of three potential sources: contract personnel, federal civilians, and military nurses. Labor and delivery services are highly dependent upon the availability of professional registered nursing staff. Recently, NNMC has been augmenting baseline nursing staff with contract personnel to maintain desired levels of obstetrical services.

Cost-benefit and cost-effectiveness analyses are reviewed, and the cost-effectiveness methodology was used to compare costs among the three alternatives. Results of the analysis using fiscal year 1991 salary and contract data suggest that federal civil service employees are the least costly source of augmenting the existing staff infrastructure to support direct patient care.

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Introduction

The National Naval Medical Center (NNMC), Bethesda, Maryland, generally characterized as the "flagship" of Navy medicine, is a tertiary care hospital providing the full range of acute and chronic health care services to beneficiaries of the military health services system (MHSS). It has an operating capacity of 427 inpatient beds. In fiscal year 1990, there were 17,137 inpatient admissions, of which 1,482 were for obstetrical care. There were an average 288 beds occupied daily (an occupancy rate of approximately 67 percent). Outpatient visits totaled 78,602 in fiscal year 1990.

Like most other military medical treatment facilities the demand for medical services exceeds the ability of the NNMC staff to provide care. In fiscal year 1990 the facility issued 751 nonavailability statements authorizing beneficiaries to receive care under the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS). Of these nonavailability statements, 78, or 10.4 percent - about 6.5 per month - were for obstetrical care.

Like all activities within the Department of Defense's military health services system, the NNMC has both a wartime and a peacetime mission. The wartime mission is to provide medical support to active duty military personnel in preparation for and during conflict. The peacetime mission is to maintain the health of the active duty force and, to the extent that space, staff, and other resources are available, to provide medical care to non-active duty beneficiaries (family members of active duty personnel, retired members, their dependents, and survivors of deceased members). An additional mission at the National Naval Medical Center is physician graduate medical education. Cost is a significant factor in accomplishing these missions, for it is generally assumed that military hospital care costs about 50 percent less than similar services received in the civilian community (United States General Accounting Office, 1990).

Given the overall requirement to meet the health care needs of the beneficiary population and to sustain physician training programs, the importance of support staff cannot be overstated. The NNMC supply of active

duty Navy Nurse Corps officers and federally employed civilian nurses has not kept pace with overall demand. According to the Head, Perinatal Nursing Department at NNMC, the primary constraint on obstetrical services in the Labor and Delivery unit is the availability of registered nurses, rather than physician services or an inadequate physical plant (G. Gutierrez, personal communication, April 15, 1991).

Hospitals confronting a shortage of Labor and Delivery nurses may choose from among several short-term options to maintain acceptable levels of registered nurse staffing and continued access to care. These include extended working hours and extra shifts for existing staff or "pulling" staff from other units. Another option is to curtail the baseline workload by referring some patients to civilian hospitals. There are several possible negatives associated with these options, such as potential compromises to the quality of patient care, poor morale among the nursing staff, and increased expenditures associated with disengaging patients to civilian sources of care. Consequently, the NNMC requires a stable, cost-effective, long-term

method of augmenting the registered nursing staff on the Labor and Delivery unit.

Literature review

Mission of the Military Health Service System.

Health care is one of the most pressing issues facing the American family. Anyone desiring health-related services faces two fundamental problems: access and payment. These issues apply to military families just as they do to the broad cross-section of Americans seeking health care. The primary mission of the Military Health Services System (MHSS) is to provide for and maintain the health of the members and retirees of the armed forces. Priorities regarding the receipt of health care at military medical treatment facilities (MTF) are established by statute, with active duty members having precedence over all other beneficiaries. In fact, care for active duty members is comprehensive, guaranteed, and, except for officers who pay a small per diem, it is free. Of the other recipients, family members of active duty personnel are entitled by law to receive care on a space-available basis, while military retirees and their family members are authorized to

receive services on a space-available basis. Contrary to popular belief, active duty members are the only beneficiaries who are legally entitled to receive care in the MHSS. (Title 10, United States Code, Section 1074).

Estimates of the total number of beneficiaries authorized to receive care in the MHSS, including active duty personnel, retirees, and family members, run as high as nine million (McAllister, 1991). considering this, the MHSS lacks the internal capacity to meet all of the health care needs of the entire beneficiary population. Recognizing this, Congress has long funded a health services entitlement plan known as the CHAMPUS Program. This program is designed to augment the capabilities of the military health services system. Under CHAMPUS, non-active duty beneficiaries are also eligible for care from civilian hospitals and health care providers. Beneficiaries who require inpatient care and reside within a 40-mile radius of a military hospital (called the catchment area) must first seek care at that hospital. If the military hospital is unable to provide the care, a

nonavailability statement is issued authorizing the beneficiary to obtain care under CHAMPUS.

Nonavailability statements are not required for emergency or outpatient care, for care received by beneficiaries who live outside the catchment area, or for care received by beneficiaries who use health insurance other than CHAMPUS.

Though structured differently than civilian health care delivery organizations, the goals and issues of the military health services system parallel those of other health care organizations across the nation. Just as in the civilian system, the cost of providing and receiving care is escalating rapidly in the MHSS.

At many facilities within the military health services system, particularly those located in remote or overseas areas, it is difficult for beneficiaries to access needed services. The problem of limited access is particularly evident in specialties that primarily serve family members, such as pediatrics and obstetrics. Manifestations of this problem, such as lengthy waits for routine appointments or situations

where services are reduced or simply unavailable, are commonplace (Baine, 1990).

Nursing shortage.

The ability to deliver a given mix of health care services requires an extensive infrastructure that includes a physical plant, equipment, consumable supplies, and an adequate supply of appropriately qualified personnel. The specialized skills of a registered nurse are necessary to oversee and provide the vast array of services that constitute nursing care in the modern hospital. Among others, these include patient assessment, nursing diagnosis, care planning, appropriate intervention, and documentation. The health care role of registered nurses has never been more central. Significant technologies have been transferred from physicians to nurses. People who become hospitalized are more ill than ever before. Physician lifestyles have also changed to become more like that of other professionals, resulting in lengthy periods when they may be away from the hospital or not easily accessible. Consequently, registered nurses are increasingly responsible for monitoring and promoting

synthesis, continuity, and coordination of care (Fagin, 1988).

In large facilities offering obstetrical labor and delivery services, one of the variables most likely to constrain the ability to offer this care is the supply of registered nurses. Physicians deliver babies, but nurses attend the mothers and newborns on a twenty-four hour basis. The capability of a hospital to provide labor and delivery services is closely tied to the availability of nurses.

Professional nursing services are also necessary from risk- and cost-avoidance standpoints, given the potential for litigation in the technologically complex obstetrical milieu. A variety of lesser qualified staff may assist with routine tasks, but, among Labor and Delivery unit personnel, only the experienced registered nurse has the in-depth, specialized knowledge necessary to assure prompt recognition and appropriate intervention when untoward changes occur in the condition of either the mother or her unborn child.

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has long recognized

the central role of the registered nurse. In its most recent Accreditation Manual for Hospitals, JCAHO requires that "a sufficient number of qualified registered nurses are on duty at all times to give patients the nursing care that requires the judgment and specialized skills of a registered nurse" (JCAHO, 1990, p. 129).

The American Nurses Association (1990) reports that hospitals nation-wide have experienced increasing difficulty recruiting registered nurses to fill vacancies in their facilities. The Inspector General, Department of Health and Human Services, stated that the demand for nursing services has fluctuated over recent decades -- from shortage in the 1960s to surplus in the 1970s and another shortage now. He also reported that hospitals have been experiencing the most severe shortage of nurses in the history of the industry, despite the fact that 80 percent of the nation's 2.1 million registered nurses were working (Kusserow, 1988).

Some note that the nursing shortage reflects a demographically dependent long-term labor supply

problem affecting all employers (Coile, 1990), yet suggestions of personnel maldistribution have been heard. Regardless of the reason, the national nursing shortage is real; it cuts across all health care delivery settings and affects all areas of nursing practice. And Department of Defense facilities are not immune to the problem. As cited in the 1990 Uniformed Services University of Health Sciences College of Nursing Feasibility Study Task Force Report, "this shortage is now seriously affecting recruitment and retention of professional nurses in the uniformed services, and in turn, the delivery of health care to the uniformed services' beneficiaries" (p. 2-2).

The impact on hospitals and their ability to provide expected and customary services is significant. Because two-thirds of nurses employed in the nursing profession work in hospitals, shortages of hospital nursing staff pose a special threat to health care access (Franco & Klebe, 1990). These threats to access are not limited to the civilian sector. A nursing shortage at military hospital could easily disrupt access to health care services, either by delays in

service or patient referral to the civilian sector through the CHAMPUS program. Attempting to maintain adequate numbers of registered nurses and thereby assure the availability of needed services, the commanding officers of military hospitals have employed the same technique used by their civilian counterparts; they have used outside agencies to acquire supplemental nursing staff.

Supplemental staffing agencies.

The nursing literature indicates that the problem of providing sufficient hospital nursing staff is long-standing (Amenta, 1977; Boyer, 1979; Luneski, 1973). The literature also suggests that a common approach to alleviating this problem centers on the use of supplemental agency personnel (Anzalone, 1981; Foster, 1987; Thompson, 1981).

Schutte (1988) reported that an American Hospital Association survey "recently found that 41 percent of its member hospitals used temporary nursing agencies to fill staffing gaps in 1987" (p. 53). Temporary nurses work either on a shift to shift basis or under contracts lasting from perhaps a month to as long as a

year. Nurses who are available for shift work tend to live in the same area as the employing agencies, while contract personnel may live locally or come from anywhere in the nation.

One of the advantages of using temporary employees is the reduction of administrative overhead at the contracting hospital, since managerial support functions are the responsibility of the agency that actually employs the supplemental staff. Supplemental nursing services have traditionally operated independently of hospitals (Prescott & Langford, 1979), which relieves the hospital of the obligations associated with employee payroll and benefits. Consequently, the infrastructure expenses associated with a large full-time staff are reduced. Institutions that use agency workers may also be able to eliminate part-time employee pools. Use of agency personnel will also save money in those institutions that provide mandatory relicensure education for permanent employees. Military hospitals that use agency nurses also avoid the costs and lost productivity associated

with military readiness training since agency personnel do not participate in these activities.

In the late 1970s, prior to the widely reported shortages in hospital nursing positions, some hospital managers even used temporary personnel to remind recalcitrant permanent staff members that they could be easily replaced (Amenta, 1977). From the management perspective, there is a final benefit of using supplemental staff: these personnel do not unionize or strike.

One of the disadvantages of using supplemental staffing personnel is the financial pressure their employment places on the salary structure within the organization. It is expensive to hire agency nurses -- sometimes twice as expensive as full-time employees (Schutte, 1988). Hospital administrators and nurse executives may find that morale suffers among permanent nurses when temporary, agency, or contract personnel are employed. Discontentment may center on objections by regular staff to working alongside temporary personnel who may be making substantially more money for similar duties (Nielsen, 1981). Morale may also

suffer if hospital staff perceive that temporary personnel have more flexibility in determining hours and days worked (Langford & Prescott, 1983). At the same time, the negative morale effects of personnel shortages may be ameliorated or completely avoided when supplemental staff are present.

From the nurse's viewpoint, associating with a supplemental nursing agency offers several advantages over full-time employment in a hospital. Among these advantages are: the ability to determine one's own schedule, the option of not working weekends, nights, or holidays, the ability to work only where you want, and higher than average pay. Since permanent personnel remain responsible for the supervisory and management functions within the employing hospital, agency nurses are able to concentrate all of their efforts on direct patient care.

Agency employers often pay nurses a straight salary with no fringe benefits. A nurse working for an agency generally forgoes paid vacation, sick pay, health insurance, and other benefits in return for a larger direct wage. In this regard, one may consider

agency nurses to be more like entrepreneurs or independent business operators than employees.

Hospitals tend to spend more for agency nurses than for their own permanent staff. Even when fringe benefits were considered, Prescott (1982) reported that hospitals were spending 43 percent more for agency nurses than their own permanent staff. Overhead paid to the contracting agency may represent some or all of the additional expenditure. Though the institutional expense for agency nurses is greater than the cost for full-time staff, the additional expenditure may be prudent. Hospitals are able to keep fixed costs in check when they contract for a limited numbers of agency nurses because such contracts have no effect on the salary structure for full-time personnel. Stated differently, hospital management may be willing to pay more for agency nurses in return for savings on marginal labor costs.

Nursing compensation.

As recently as twenty years ago, nursing was one of two dominant careers pursued by women desirous of entering the professions, the other being teaching.

This changed in the 1970s and 1980s, when transformation of the American social fabric paralleled equally significant changes in the labor market. Numerous careers, previously inaccessible, became viable options for women. Faced with these new options, one of the factors that drew women to other careers, or kept them from considering nursing, was compensation.

According to Kusserow (1988) "nurses have traditionally been the lowest paid . . . professional members of the health care team" (p. 312). The 1987 National Survey of Hospital and Medical School Salaries (cited in Aiken and Mullinix, 1987) revealed that a nurse's average maximum salary was approximately \$7,000 higher than the average beginning salary. In 1989, Mills noted that nurses entering the profession from college could expect to command a starting salary similar to other college graduates, but that there was only a very narrow range for career salary growth.

In December 1987, Department of Health and Human Services Secretary Otis Bowen established the Secretary's Commission on Nursing to examine the

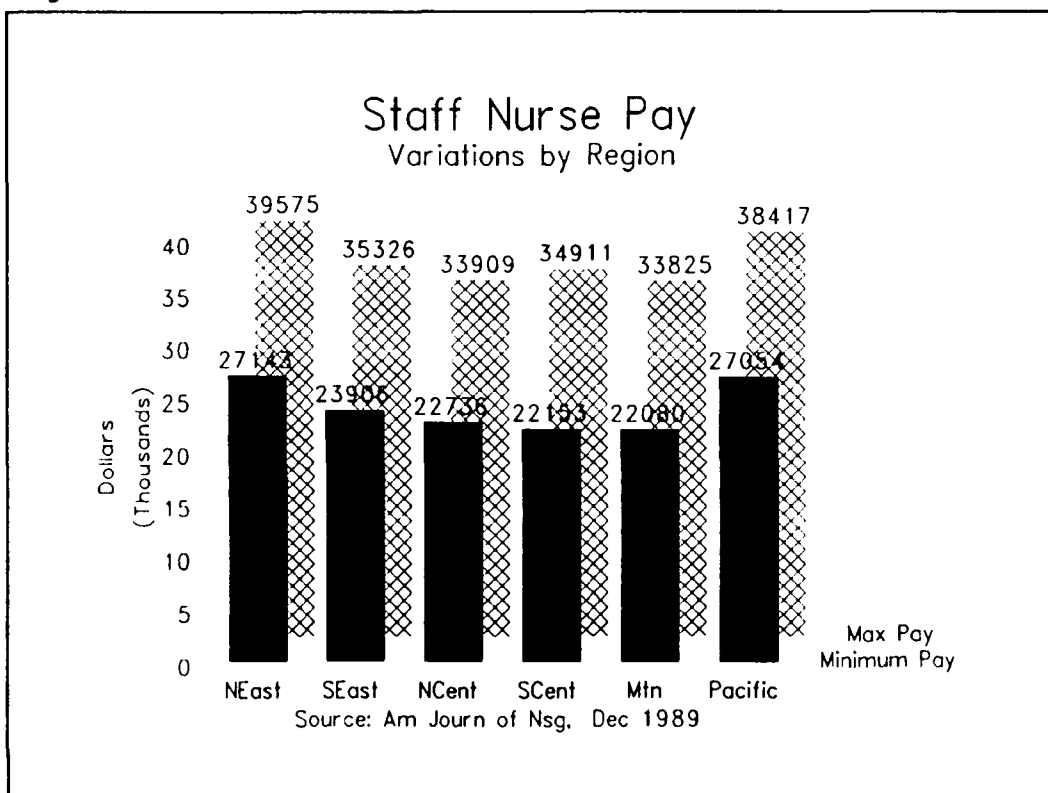
reported nursing shortage. The Commission made recommendations in six broad categories: utilization of nursing resources, health care financing, nurse decision making, development of nursing resources, maintenance of nursing resources, and nurse compensation. The Commission's report noted that:

Nurse compensation is inadequate and that severe wage compression over a nurse's career is of particular concern. The Commission believes that inadequate compensation is one of the roots of the current nurse shortage. On the demand side, low RN compensation levels relative to those of other personnel for which RNs can substitute encourage employers' inappropriate utilization of RNs in carrying out non-RN functions. On the supply side, compensation levels lower than those of other professions requiring comparable educational preparation may encourage existing nurses to leave the profession, thus exacerbating the current shortage. In the longer-run, inadequate compensation is also likely to discourage potential nurses from entering the profession,

contributing to a continuation of the shortage
(Secretary's Commission on Nursing, 1988, p. vi-
vii).

Mills (1989) notes further that nurse executives
consider increased salary to be directly related to

Figure 1



both improving the supply and reducing the number of unfilled vacancies.

Concurrent with the Secretary's Commission on Nursing, Cole and Sizing (1988) reported that hospitals across the nation were fighting their nursing shortages by increasing the salaries of nurses and nurse managers. A 1989 American Journal of Nursing report reflected this trend, noting that "with raises running 5-10%, average pay for staff nurses reached a range of \$26,000-\$37,000 across the country" (p. 1674). Despite recent increases, staff nurses can expect career salary growth of only 42 to 58 percent, as opposed to more than 100 percent in other professions. Figure 1 displays the range of registered nurse salaries from the report cited above.

Pay Equity.

Closely linked to the issues of compensation and salary compression in the nursing profession is the issue of pay equity among the sexes. According to the Bureau of the Census (1990), 94.6 percent of nurses were women. In 1983 the Illinois Commission on the Status of Women reported that male-dominated jobs

offered consistently greater salaries than female-dominated jobs across all levels of job complexity. Those working in the most complex position studied, clinical nurse specialists, earned monthly salaries more than \$700 lower than electricians, who were ranked eighth in job complexity (cited in American Journal of Nursing, 1984). The relative wages of women to those of men have been reported to range from approximately 60 percent (Disch & Feldstein, 1986) to 64 percent (Pennar & Mervosh, 1985). Paying lower salaries to women, in this case nurses, is certainly advantageous to employers. But in the long-term lower pay may serve to draw potential nurses to other careers. A Public Health Service report indicates that "a 1% relative wage increase for similar professions eventually leads to an estimated decrease of 16,000 nursing entrants per year" (cited in Friss, 1988). When shortages develop, hospitals employ a variety of methods to avoid significant gaps in staffing, including educational bonuses, day care centers, refresher courses, publicity, and increased use of nurses obtained through supplemental staffing agencies.

Cost-benefit analysis.

Among the many management principles, a primary tenet involves committing resources and expending funds to obtain the greatest organizational benefit. Wise stewardship of funds is necessary for any corporation to attract investors and retain profitability. The basic doctrine of wise financial management also applies to the management of public funds. Cost-benefit analysis (CBA) is one methodology used in the public sector to help assure wise financial management. It was developed as a systematic approach to choosing among public sector investments, and, according to Klarman (1974), it derives from the synthesis of theoretical advances in welfare economics and public finance. In describing the role of CBA in the public sector, Klarman (1974) states that:

The goal of public policy is to adopt those projects or programs of service that yield the greatest surplus of benefits over costs. Evaluation of projects is prospective, oriented toward the future. The criterion of choice, analogous to that of maximizing profits in the

market economy, is to maximize present value. Stated differently, but meaning the same, the criterion is to equalize marginal benefit and marginal cost. (p. 326).

Eastaugh (1987) similarly notes that "the objective of cost-benefit analysis is to maximize net benefits (benefits minus costs, appropriately discounted over time)" (p. 438). Weinstien (1980) agrees, noting that CBA compares investments in different programs and then values all outcomes, including mortality and morbidity, in the same economic (usually monetary) terms.

Feldstein (1988) notes that cost-benefit analyses, or non-market studies, are valuable in determining the optimal level of output in situations where there are externalities. Noted economists Samuelson and Nordhaus (1989) define externalities as "an activity that affects others for better or worse, without those others paying or being compensated for the activity. Externalities exist when private costs or benefits do not equal social costs or benefits" (p. 972).

The benefit-cost approach assumes that all units of output will be monetized, thus allowing direct

lateral comparisons of diverse projects with vastly different outputs. At the national level, CBA allows government officials to decide among competing projects sponsored by the Departments of Defense, Agriculture, Energy, Transportation, and others. As in other areas, cost-benefit analyses in health care require that years of life saved be converted into a dollar-based value. After costs and benefits are monetized and computed, the net present value of benefits is calculated as the difference between these factors. If the net present value is a positive number, the project should commence; if the net present value is a negative number, the program should not be implemented.

A major detriment in health care cost-benefit analysis is the requirement to value human lives and the quality of those lives in monetary terms. Weinstien (1980) comments that many health care decision-makers find this aspect of CBA particularly distasteful, perhaps even unethical, and for that reason these decision-makers may tend to not trust analyses that depend upon such monetary valuations.

Counting costs and benefits requires deciding what to include and what to exclude from one's analysis. Once the decision is made to include any particular item, the analyst must accurately determine its proper value. Once costs are determined, benefits are usually classified into three categories: direct, indirect, and intangible. Direct benefits represent the portion of averted costs currently borne by an organization that are attributable to spending for particular goods or services. As such, they reflect potential tangible savings. Precise assessment of direct benefits, or current costs averted, is accurate only when a single good or service is produced. It is difficult, at best, to accurately determine costs where several goods or services are produced. It is equally cumbersome where average unit cost procedures are used to allocate overhead and joint costs. For example, in this analysis the National Naval Medical Center derives a direct benefit from averted CHAMPUS costs, since those expenditures would inevitably increase if labor and delivery services were curtailed due to a shortage of registered nurses. This benefit is assumed to be the

same regardless of whether the Labor and Delivery nurse is military, civilian, or contract. It does not effect the outcome of this analysis and is therefore excluded from consideration.

Perhaps the most prominent example of indirect benefits is the future earnings stream that continues when premature death or disability is averted. The value of an individual's future earnings can be found in tables that use labor force participation rates, employment rates, mean earnings, and fringe benefits to determine national averages. Rice (1966) was among the first to publish such tables, which greatly facilitate the process of determining the net present value of lost earnings due to mortality. In this study the NNMC derives indirect benefits from having additional staff available during emergency situations, increased satisfaction among the existing staff when additional staff are available, and an enhanced image within the military and medical communities.

The value of intangible benefits is the most elusive and difficult to calculate. Within the health care context, pain, discomfort, and grief are

associated costs of illness; any treatment or service that averts these symptoms represents an intangible benefit. For this analysis, averted anxiety and discomfort are considered intangible benefits, while the costs related to anxiety and discomfort resulting from delayed nursing care represent intangibles costs. However, because these effects are not traded in the marketplace there is no predictable price associated with them. These intangible costs and benefits do not vary as a function of the type of Labor and Delivery nurse on duty at NNMCC, i.e., military, civilian, or contract. Consequently, there was no attempt to impute the monetary value of these factors. Mishan (1982) advises that it is practical and desirable to offer a narrative explanation of the such factors and then place a descriptive entry in the costs and benefits summary. Consistent with this approach, significant intangible costs or benefits that were discovered are acknowledged, but excluded from the analysis.

Cost-effectiveness analysis.

The term cost-benefit analysis is often, and incorrectly, used interchangeably with the term cost-

effectiveness analysis. The two methodologies are distinctly different. Cost-effective analysis (CEA) uses the same cost and benefit determinations as those used in performing CBA, but toward a different end. CBA aims at determining the highest net-present value among competing projects. The alternatives under consideration may include such diverse projects as the purchase of food service equipment, remodeling the clinical laboratory, or hiring additional medical records staff. The goal of CEA, on the other hand, "is to rank-order the preferred alternatives for achieving a single goal or specified basket of benefits" (Eastaugh, 1987, p. 438). CEA centers on finding the most efficient or productive use of limited resources. Unlike CBA, it does not require monetization of the value of life and health (Weinstien, 1980).

Resources are often expressed in monetary terms when the CEA methodology is used, but may be also represented in other units such as bed days or hours of nursing care. Like CBA, CEA requires that outcomes be expressed in some unit of measurement. The CEA measure may be expressed in physical terms, such as the number

of nurses hired, or as the monetary cost per unit of some output. The unit of measure used in this analysis is the cost per full-time equivalent (FTE). The overall task, then, is to determine the solution that yields the desired outcome at the lowest cost per FTE.

When several options are considered simultaneously, the various alternative solutions are listed in rank-order based on units of cost-per-effect output. Alternatives are then selected, starting with the highest ranked program, until available resources are exhausted. The cut-off for permissible cost-per-unit of benefits achieved is attained when available resources are exhausted, or when the resource sponsors are no longer willing to pay for the benefits achieved (Weinstien, 1980). This approach helps assure that maximum benefits are attained within resource constraints.

Unlike the CBA methodology, the CEA model does not allow ready comparison among programs that have different types of outputs. CEA does, however, allow the use of qualitative indicators and is readily incorporated into the federal Programming, Planning,

and Budgeting System. For example, it is difficult to perform a side-by-side comparison of nursing cost-per-bed-day and food service preparation time per-meal-prepared since the units of output are so different.

It's a lot like apples and oranges. If someone is trying to decide whether to buy apples or oranges, CBA is the preferred technique because it monetizes all variables to produce a final positive or negative rating. All the purchaser has to do at that point is buy the item with the highest rating, since it will bring the greatest overall benefit once all costs are paid. Conversely, if the analysis centers on deciding what type of oranges to buy from among many varieties available, then the CEA methodology is most appropriate because it tells the average cost per orange. Once that is known, the purchaser merely buys those oranges with the lowest cost per unit.

Civil service employee issues.

The Office of Personnel Management (OPM), located in Washington, DC, provides central oversight of federal civilian employee issues. Within the Department of Defense, Consolidated Civilian Personnel

Offices (CCPO) act as local OPM representatives for administration and enforcement of civil service laws and regulations.

CCPO uses several different procedures to hire civilian employees for DoD medical activities. The typical federal hiring process is accomplished using a procedure known as delegated examining authority.

Using this method, CCPO advertises vacant positions, and then accepts, rates, and finally ranks applicants for suitability. Once the job announcement closing date has passed, the CCPO provides a list of qualified applicants to the manager of the vacant position.

Delegated examining authority is used to fill most medical treatment facility positions, such as clerical workers, para-professionals, technicians, and so forth.

Difficult to fill positions, such as those requiring physicians and nurses, are governed by a procedure known as direct hire authority. For these positions CCPO is able to accept, rate, and refer applications locally. Because there is no need to formally announce vacancies or establish and maintain applicant rosters, this is the fastest means of hiring

personnel. A third process, merit promotion, is used for personnel already employed by the government who are attempting to advance on the federal career ladder.

In all three cases a certificate of eligibles is prepared, listing qualified candidates, for use by agencies intending to hire new personnel.

Managers with vacant civilian positions initiate the recruiting process by submitting to CCPO a Standard Form 52 (SF-52), Request for Personnel Action. If the manager is requesting a new position, a proposed position description accompanies the SF-52. To assure funding is available, all SF-52s are approved by the financial manager and facility commander before submission to CCPO.

At CCPO, a classifier evaluates and grades the position using classification standards provided by the Office of Personnel Management. The OPM standards set minimum educational standards and prior job experience necessary for an applicant to be considered for a particular position. By employing these standards, consistency of responsibility and remuneration are

maintained within occupations throughout the federal civil service system.

Title 5 of the United States Code, Section 5303, authorizes OPM to approve special salary rates for certain occupations. At medical activities, these rates provide compensation above the standard civil service pay scale for health care providers such as physical therapists, pharmacists, and nurses. Special pay scales are not designed to provide parity with prevailing local salaries or to relieve anticipated staffing shortages. Instead, special pay scales are intended to lessen the hiring and retention effects posed by salary competition in the immediate civilian community.

Contracting issues.

A contract is a tool used to acquire goods or services from a vendor. The Constitution of the United States of America (1787) grants the government the authority to contract for materiel and services necessary to meet the federal mission. The Armed Services Procurement Act of 1947 governs contracting authority within the Department of Defense (DoD).

Practical, day to day contracting guidance for all federal agencies is contained in the Federal Acquisition Regulation (1990). DoD agencies designate specific officers to oversee contract-related matters at subordinate military activities or commands. Given the scope of this responsibility and the difficulty of closely monitoring the performance of every DoD contract, these Contracting Officers are empowered to designate one or more local assistants. Such assistants are known as Contracting Officer Representatives (COR). A COR is authorized to take any action under the contract the Contracting Officer would take, except a COR is not allowed to award, agree to, sign or modify a contract, or in any way obligate the government to spend money.

There is a broad selection of contracts available to the Government, varying by the degree of responsibility the contractor assumes and the profit incentive structure. Contracts fall into two general categories: fixed-price and cost-reimbursement. According to the Federal Acquisition Regulation (1990):

"Specific contract types range from firm-fixed-price, in which the contractor has full responsibility for the performance costs and resulting profit (or loss), to cost-plus-fixed-fee, in which the contractor has minimal responsibility for the performance costs and the negotiated fee (profit) is fixed. In between are the various incentive contracts . . . in which the contractor's responsibility for the performance costs and the profit or fee incentives offered are tailored to the uncertainties involved in contract performance" (p. 16-1).

The essence of a service contract is the Statement of Work, also referred to as the performance work statement, scope of work, specifications, or technical requirements. The Statement of Work details the essential and technical requirements the contractor will perform. It is unambiguous and written in sufficient detail to allow potential contractors to submit reasonable offers. The contract specifies the government's minimum needs, allows for open

competition, and includes measurable performance standards.

The Federal Acquisition Regulation (1990) allows two primary methods for contracting: the sealed bid and the competitive proposal, which is generally called a negotiation. Sealed bids are preferred, although negotiation is acceptable if the contracting officer justifies its use. Negotiation is generally used when it is necessary to discuss bids with contractors, when awards will be based on factors other than price alone, when there is not enough time to conduct sealed bidding, or when there is only one contractor likely to submit a bid.

Fixed procedures are employed when the sealed bid method is used. For instance, no modifications are allowed once the bids are submitted, bids may not be withdrawn once they are opened, and the contract must be awarded to the lowest bidder.

Competitive proposals are more flexible. Applicants may modify their proposals during negotiations, or even withdraw from competition. Perhaps the biggest difference, though, is that the

government is under no obligation to award the contract to the applicant offering the lowest price. Instead, factors such as prior performance and technical excellence may be used as the foundation for making the award.

When it is necessary for the government to contract for needed services, prospective contractors are asked to submit price offers. This solicitation is known as an invitation for bids or a request for proposals, depending on whether an agency desires sealed bids or competitive proposals. Once prepared, the solicitation is widely circulated to promote maximum competition.

Medical Treatment Facility (MTF) commanding officers may use contracts to alleviate staff shortages. As noted in the Navy Medicine directive governing contracts (Bureau of Medicine and Surgery Instruction 4283.1, in press), health care contracting is intended to "bring needed physicians, nurses, and other ancillary personnel to the treatment facility so that outpatients and inpatients [may] be treated using

available internal support services that would otherwise be inefficiently utilized" (p. 2).

If contract nurses are needed, the Contracting Officer will generally use a personal services contract, which essentially establishes an employer-employee relationship between the government and the contractor. In these cases, the terms of the contract will dictate the level of direction and supervision the contract employees will receive. Personnel who work under personal services contracts are effectively government employees. As such the government may be liable for the negligent or wrongful acts or omissions of personal services contract staff who are engaged in government business.

Federal regulations specify a maximum salary that may be paid to registered nurses working under personal services contracts. Table 1 shows the maximum salary payable to a contract registered nurse in the Washington, DC, area, and the elements that combine to form that salary cap. Maximum physician and nurse practitioner salaries are shown for comparison.

Table 1

Maximum Compensation Authorized for Contract Employees in Wash, DC area

	Group I	Group II	Group III
	Physicians Dentists	Nurse Practitioners	Registered Nurses
Equivalent Paygrade	0-6	0-5	0-4
Years of Service not to exceed	>26	>20 but <22	>16 but <18
Base Pay	5,052.60	4,146.60	3,492.00
Quarters	704.40	706.50	623.10
Subsistence	123.92	129.00	129.00
Variable housing	341.47	435.18	449.39
Total/Mo.	6222	5417	4693
Total/Yr.	74,669	65,007	56,322
Hourly (2080 hr/yr.)	35.90	31.25	27.08

Background

The National Naval Medical Center (NNMC), Bethesda, Maryland, is a military hospital operating under the purview of the United States Navy's Bureau of Medicine and Surgery and the Department of Defense. Active duty Navy Nurse Corps officers form the core of the nursing staff at NNMC. Federally-employed civilian nurses augment the active duty roster and assure long-range continuity among the staff.

In recent years, Navy nurse recruiting has not kept pace with the demand for Nurse Corps officers.

This recruiting shortfall has historically resulted in vacant Nurse Corps billets at the NNMC. Additionally, federal personnel management policies and the competitive nature of the civilian nursing marketplace have hampered the ability of the command to obtain desired numbers of federally-employed civilian nurses. Despite these encumbrances, the local beneficiary population continues to seek health care at NNMC. Since the availability of nursing staff is a primary constraint on the provision of care, NNMC has endeavored to augment the nursing staff with contract personnel.

Up until 1988 the only registered nurses working at NNMC were Nurse Corps officers or federal civil service employees. Before that time it was impossible, by regulation, to augment the staff with contract nurses.

Nursing contracts are considered personal services contracts, and the Federal Acquisition Regulation (1990) stipulates that "agencies shall not award personal services contracts unless specifically authorized" (p. 37-2). In 1988, the Secretary of the

Navy issued a waiver allowing Navy medical treatment facilities to award personal services contracts for nurses. Soon thereafter NNMC began to augment the clinical staff with contract nurses. Contracts were awarded for nursing services in nine specialty areas. Additional staff were thus obtained for labor and delivery, inpatient obstetrics, newborn intensive care, inpatient pediatrics, medical-surgical, intensive care, coronary care, neurosurgical intensive care, and recovery room. Eight of the original contracts remain; the ninth, covering the Labor and Delivery nursing staff, is in default (J. Wieland, personal communication, 28 May 1991).

There is an ongoing need for obstetrical services within the beneficiary population. After the Labor and Delivery contractor defaulted, the NNMC leadership perceived two options as being feasible to assure Labor and Delivery services were available to beneficiaries: directing patients to the civilian community for obstetrical care under CHAMPUS, or short-term small-purchase contracting. The Head, Health Care Contracting, reported that small-purchase contracting

was preferable for two reasons. Contracting would keep obstetrical patients at NNMC, which would hold CHAMPUS expenditures in check. And by retaining this workload, there would be no untoward impact on the NNMC Graduate Medical Education programs that depend upon this patient base (G. Boechler, personal communication, 28 May 1991).

The small-purchase option was quickly chosen. Under this arrangement, multiple bids were sought to meet recurring, near-term personnel needs on the Labor and Delivery unit (J. Wieland, personal communication, 28 May 1991). The purchases were actually small contracts covering periods up to three weeks duration, and served to meet the immediate staffing requirements of the Labor and Delivery unit.

Purpose

The focus of this paper is to determine the most cost-effective method of augmenting the registered nurse staff on the Labor and Delivery unit at the National Naval Medical Center, Bethesda, Maryland. Registered nurses are available from several potential sources. The central question is whether it is most

effective from a marginal cost perspective to use contract nurses, federally employed civilian nurses, or military nurses in meeting this additional staffing requirement. Building on the earlier analogy comparing CBA to CEA, this study is similar to choosing among three different varieties of "oranges" to fill a basket to capacity. Given the task, CEA was considered the most appropriate methodology for selecting the least costly source of additional registered nurses for the Labor and Delivery unit.

Methods

Design

This project was conducted using an economic analysis model similar to that employed by the Health Services Contracting Division at the National Naval Medical Center. It used secondary data, i.e., from published or publicly available sources, rather than primary research.

To employ economic analysis effectively, specific goals and values need to be articulated. In this case, the goal was to determine the most cost-effective source for providing seven additional registered nurse

full-time equivalents to the Labor and Delivery unit at NNMC. It is, however, important to note that the public (political) process may cause non-economic factors to be brought into the final decision (Klarman, 1974). In other words, the final decision regarding which category of nurse to employ may not be based solely on economic factors.

Several assumptions are necessary to clarify the final analysis. It is assumed that the Health Care Contracting Officer will normally perform the economic analysis and provide recommendations to higher authority. The ultimate decision-maker is assumed to be the Director of Nursing Services, who is responsible for all nursing functions within the command.

Since money has both present and future value, and because benefits are time-domain dependent, all costs and benefits were considered in terms of their present value. Costs and benefits associated with increasing the number of registered nurses on the Labor and Delivery unit were evaluated, and only those that were tangible were included in the final analysis.

Intangible costs and benefits are noted in the analysis summary.

Procedures

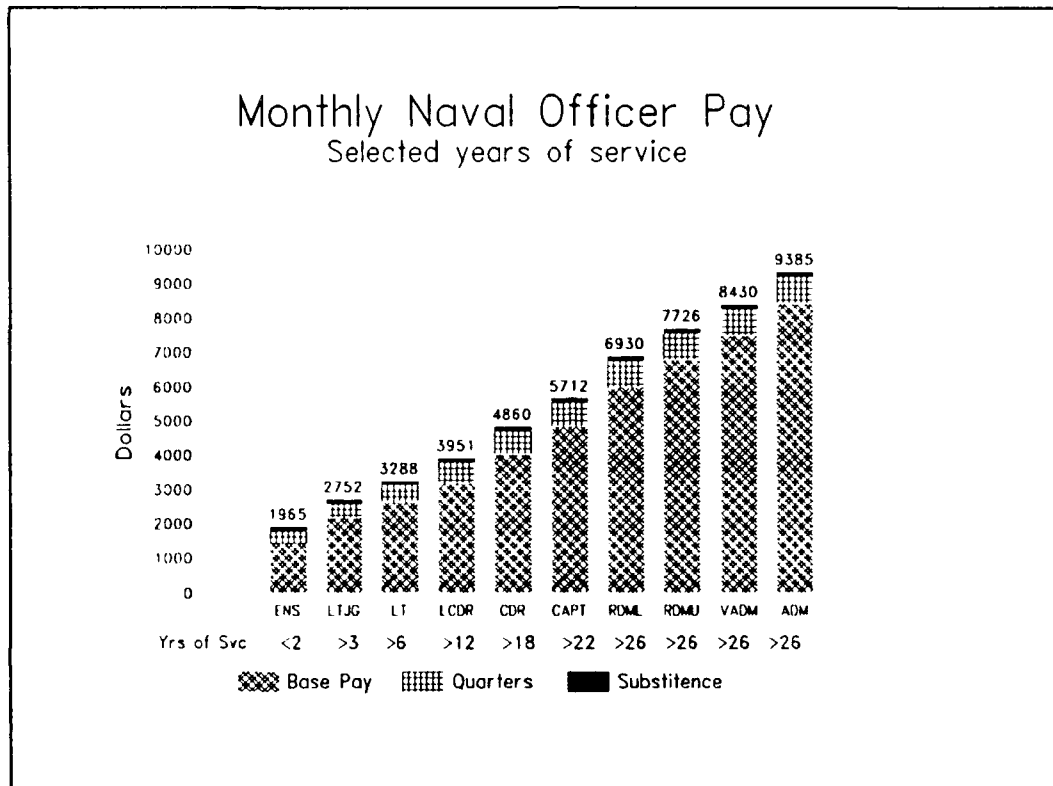
The author used fiscal year 1991 published salary charts and current NNMC contract pricing data to compare the marginal costs of increasing registered nurse staffing. Measures were adapted from the Contract Analysis Worksheet used by the Health Care Contracting Division at NNMC. The cost analysis format specified in the 1990 Alternate Use of CHAMPUS Funds Project Management Guide (Deputy Assistant Secretary of Defense for Health Services Finance, 1990), served as an additional reference. All factors were reviewed and endorsed by the Head, Health Care Contracting Division, National Naval Medical Center, Bethesda, Maryland.

Measures and Data

The annual cost to the Navy for active duty military nurses is \$68,245. This was derived from the annual budgeted salary per Naval officer as determined by the staff of the Chief of Naval Operations (CNO). It accounts for all budgeted salary and benefits, including Social Security contributions, FICA match,

special pay, retirement, and so forth. The CNO's staff determines this amount by computing a direct average from the aggregate salary and fringe benefits of the entire corps of Naval officers. This does not, however, reflect the salary officers actually receive; Figure 2 displays a sample of the fiscal year 1991 basic pay and allowances paid to naval officers in various paygrades. The \$68,245 budget figure was used in this analysis because it is consistent with actual Navy financial planning practices, and because officer salaries are not paid by individual commands but rather by a central authority.

Federal civilian nursing personnel salaries are set by the Office of Personnel Management (OPM) in Washington, DC, in accordance with legislative guidance from the Congress of the United States. Regional salary variations reflect cost-of-living adjustments. At NNMC all Labor and Delivery staff nurse positions are rated as General Schedule (GS) grade 11. Using manage-to-payroll authority the Commander, National Naval Medical Center, is able to adjust the number and variety of civilian personnel to meet the mission of

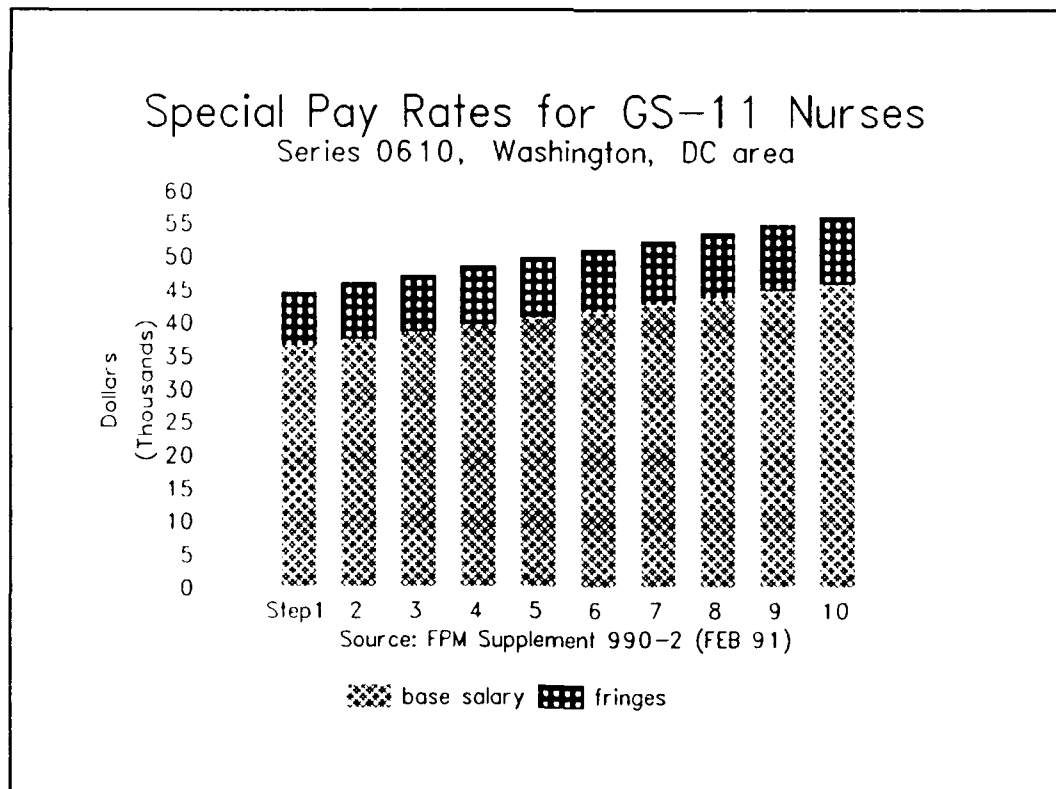
Figure 2

the command most effectively. However, any manage-to-payroll adjustments must not cause the command to exceed its personnel budget ceiling. This process allows a Commanding Officer to "trade" a nurse for a social worker, or a laboratory technologist for two clerical staff, as long as he or she does not exceed the overall payroll expenditure target. With manage-to-payroll authority the Commanding Officer can adjust the combination of civilian personnel much more readily

than the military staff. There is no similar authority to modify the active duty staff mix.

All labor and delivery nurses at NNMC are rated at the GS-11 level. Figure 3 shows total salary for these nurses as reflected in the 1991 Special Rate Salary Authorizations for Series 610 nurses (total salary includes base salary plus the 23 percent adjustment the

Figure 3



Office of Personnel Management budgets for fringe benefits). The GS-11, Step Five, salary was used in this analysis because it represents the salary midpoint for Labor and Delivery registered nurses. Additionally, nurses at this level have similar or greater qualifications and experience to those required of nurses working under the Labor and Delivery contract.

NNMC has recently obtained Labor and Delivery nursing services using short-term contracts with local agencies. The contracting procedure has involved repeated solicitation of bids for a specific number of professional nursing hours over a short-term (usually three weeks or less). Assuming a 2,080 hour work-year, the annualized expenditure for a full-time Labor and Delivery nurse, professionally qualified at a level similar to the federal civilian nurses working Labor and Delivery at NNMC, was \$65,062. This is based upon actual NNMC expenditures over the first eight months of fiscal year 1991. Hourly rates paid to the agencies ranged from \$27.05 to \$55.00, including agency overhead

and any fringe benefits paid to individual contract nurses. The average hourly fee NNMC paid was \$31.28.

NNMC incurs a one-time orientation expense for new staff, military and civilian alike. Like permanent staff, contract nurses are required to complete two work-days (16 hours) of orientation. In all cases, this expenditure was considered as separate from the annual salary since the familiarization period is assumed to be non-productive in terms of usual work responsibilities.

Using the budgeted salary for Naval officers, it costs \$528 to orient newly reported Navy nurses to the Labor and Delivery unit. The NNMC expense for providing the same 16 hour orientation to a civilian nurse orientation is \$383. In contrast, there is no government cost for contract nurse orientation, since these expenses are paid by the agency employing the contract nurse.

Contract provisions and CCPO hiring practices assure that all newly employed registered nurses coming to the NNMC Labor and Delivery unit from agency or civil service sources possess the professional

requirements necessary to function in a high-risk obstetrical setting at the time of original employment.

There are no similar assurances regarding newly reporting active duty nurses. Navy hospitals have no control over the process that brings in new military personnel. Staff at the Bureau of Naval Personnel, which is the Navy's central manpower headquarters, control the overall assignment process, often consulting medical treatment facility leadership regarding command requirements. The personnel assignment process is quite dynamic, and it has numerous goals. Several factors must be considered before a Navy nurse is ordered to a particular facility, including the command's overall manning level, the rank and mix of staff, the command's health care specialty requirements, the individual's career needs, and the officer's desires. Considering these and other variables, the difficulties of achieving optimal staffing become apparent. Even when new or existing staff have experience in obstetrical nursing, this background may be limited to routine obstetrics. There is no assurance, then, that any newly reporting

Nurse Corps officer will be prepared professionally to function on the high-risk Labor and Delivery unit at NNMC.

Historically, obstetrical patients in military hospitals have been family members, which meant that there was minimal wartime contingency requirement for obstetrical nurses. Even with women in the active duty force, perinatal nursing skills are not critical go-to-war requirements for the Navy medical department. Crucial wartime nursing skills are instead directed toward caring for combat injuries and related illnesses, which means the Navy has greater need for nurses with surgical and medical experience than for other specialties.

Consistent with this, the Head, Perinatal Nursing Department, noted that most Navy nurses being assigned as permanent staff on the Labor and Delivery unit would require additional training. NNMC experience indicates that this training involves a minimum of six months on-the-job specialty education and practice before the active duty nurse became proficient at a level comparable to the civilian or contract nurses already

on the staff (G. Gutierrez, personal communication, 1 July 1991). Based on the budgeted salary for active duty nurses and assuming the officer's salary was the only chargeable expense, the minimum six months training would cost the government \$34,303.

It is also necessary to consider the indirect costs associated with hiring various types of nurses in addition to the direct costs enumerated above. Though indirect, such costs are real and must be factored into the analysis to determine total hiring costs. The first of these is the cost of procuring any category of nurse.

The mechanism of recruiting Navy nurses is very similar to the assignment or detailing process. Nurse Corps recruiting is centrally managed under the auspices of the Navy Recruiting Command in Washington, DC. Recruiting is funded independently, and takes place entirely outside the Navy medical department. The expense of recruiting a Navy nurse is therefore transparent to the National Naval Medical Center. For the purpose of this analysis, NNMC incurs no expense in recruiting any newly reporting Nurse Corps officer.

The NNMC Consolidated Civilian Personnel Office (CCPO) manages civilian nurse recruiting for the hospital. In the 12 month period ending May 1991, CCPO hired 50 civilian nurses (40 registered nurses and 10 licensed practical nurses) for NNMC. Civilian nurse recruitment activities require one-half of a full-time CCPO employee (0.5 FTE). At NNMC this employee is a GS-12, Step 3, earning \$39,780 annually plus fringe benefits. Assuming that 50 nurse hires per year is a representative average, NNMC incurs a \$489 expense to recruit each of these new employees. According to the Director, CCPO, job fair and newspaper advertising expenses add an additional \$100 per nurse hired (P. Caulfield, personal communication, 24 June 1991). The total NNMC expense for recruiting a civilian nurse amounts to \$589 per new employee.

NNMC expenditures for contract nurse procurement equate to the contract administrator's salary and fringe benefits. The contract administrator position is rated at the GS-7/9 level; the usual incumbent is a GS-7, Step 2 whose total compensation, including fringe benefits, is \$26,721. Recent experience indicates that

the contract administrator devotes approximately 30 percent of the work week to oversight of the labor and delivery contract solicitations (G. Boechler, personal communication, 28 May 1991). Thirty percent of the contract administrator's total compensation was subsequently allocated to Labor and Delivery contract oversight. Based on acquiring the desired seven full-time equivalent registered nurses for the Labor and Delivery unit, the procurement expenditure per nurse is \$1145.

Results

Table 2 shows the projected cost to the Navy for procuring an additional registered nurse from each of the three sources discussed above: active duty, federal civil service, or contract. Only current year costs are shown. Since current costs reflect net present value, these costs could not be discounted further.

Of the three sources considered, federal civilian nurses are the least costly source of augmenting the staff of registered nurses on the NNMC Labor and Delivery unit. If federally-employed registered nurses were added to the Labor and Delivery staff in the year

L&D Nurses

55

Table 2

COST ENUMERATION OF EMPLOYING VARIOUS CATEGORIES OF LABOR AND DELIVERY NURSES

	Categories of Nurses Considered		
	Military	GS-11, Step 5 Civilian	Contract
<u>DIRECT COSTS</u>			
Base Salary			
2080 hour work year	68,605	40,449	65,062
Fringe Benefits - pension, vacation, insurance			
Military - included in base salary	0		
Civilian - 23% extra		9,303	
Contract - included in contract fees			0
SUBTOTAL - Salary and Fringe Benefits	68,605	49,752	65,062
Orientation - 16 hours	528	383	0
Military hourly rate = 32.98			
Civilian hourly rate = 23.92			
Contract hourly rate = 31.28			
(contractor orientation at no cost to govt)			
Training to achieve proficiency	17,151	0	0
SUBTOTAL - DIRECT COSTS	86,285	50,135	65,062
<u>INDIRECT COSTS</u>			
Procurement - Job fairs, advertisements, etc.	0	590	0
GS-12, Step 3 (.5 FTE) for 50 nurses hired annually			
Contract administration per FTE	0	0	1,145
GS-7, Step 2 (.3 FTE) for 7 contract nurses			
SUBTOTAL - INDIRECT COSTS	0	590	1,145
TOTAL DIRECT AND INDIRECT COSTS	86,285	50,725	66,207

DIRECT INTANGIBLE BENEFITS

Greater individual productivity due to improved unit efficiencies.
Increased unit stability associated with civilian nurses who will not deploy during hostilities.
Averted patient anxiety and discomfort due to increased staffing.

INDIRECT INTANGIBLE BENEFITS

Increased satisfaction of core nursing staff due to additional personnel.
Increased staff availability during emergency situations.
Improved command image among hospital staff and within community.

Decision Criteria:

Lowest Present Value ----->	86,285	<u>50,275</u>	66,207
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Using the Lowest Present Value criteria, federal civil service nurses are the least costly alternative for acquiring additional registered nurses for the Labor and Delivery unit at the NMMC.

of this study, the total marginal cost per nurse to the Navy would be \$50,725 (base salary plus fringe benefits, orientation, and procurement). In comparison, the next least costly alternative would be to increase Labor and Delivery unit staffing by contracting for agency-employed registered nurses at an average cost per full-time-equivalent of \$66,207 (base agency fee plus contract administration). The most costly alternative for increasing the staffing on the NNMC Labor and Delivery unit would be to supplement the staff with Navy nurses, each at a cost of \$86,285 (average budgeted salary plus orientation and training).

Discussion

Conclusions

The most cost-effective option for augmenting the registered nurse staff on the Labor and Delivery unit at NNMC is to hire additional federal civil service nurses. The contract and active duty Navy nurse options could be cost-effective if the goal was different. Yet when the objective is to augment the registered nurse staff beyond its existing size, the

most cost-effective solution is to hire more civilian nurses through the federal civil service. Adding federal civil service employees would increase the staff to the desired size, assure that existing, permanent staff are able to fulfill their administrative responsibilities, maintain the infrastructure of the unit, and offer the lowest marginal cost increase per full-time-equivalent.

The cost per nurse derived in this model does not take into account that the present full-time staff is involved in a diverse array of activities that do not involve direct patient care. Examples of such non-patient care activities include committee meetings, accreditation activities, in-service education presentations, supervision of subordinate personnel, contingency and readiness training, and counselling. These are all necessary functions, but other staff must take responsibility for patient oversight when a nurse is engaged in one of these activities. This "back-filling" or redundancy represents an indirect cost to the command that must be considered in any decision regarding the type of personnel to hire for a ward.

However, the data available for this study did not allow reliable analysis of the dollar value of these costs.

It is also important to note, though, that a contract full-time-equivalent nurse provides 2080 work hours per work-year (40 hours per week for 52 weeks). There is no vacation, sick leave, education allowance, or administrative time included in that work-year. If a particular contract employee becomes ill, the contracting agency must replace that individual. From that standpoint, one contract nurse equates to more than one full-time staff member. This effectively increases the cost for each military or civilian full-time equivalent.

This is an important factor when considering marginal cost increases associated with staffing requirements, because fewer contract nurses are required to replace any given number of permanent staff. The precise equivalency factor must be determined locally, although some estimates indicate that one contract nurse may be substituted for up to 1.4 permanent staff members. This was not considered

in this analysis because the goal was to augment the staff, not replace it.

Contract personnel provide eight-hours of direct care and interaction with the patients for every eight hours of pay, whereas permanent staff inevitably become involved in the activities noted above. This advantage would be significantly reduced or even eliminated if contract personnel assumed responsibility for unit management, administrative requirements, staff teaching, supervisory needs and the other tasks associated with running a hospital ward.

Based on the assumptions of this study and the costs expressed in the analysis, the most expensive additional personnel are Navy Nurse Corps officers. Given the three registered nurse sources offered in this model, it would be difficult to justify augmenting routine Labor and Delivery services with Navy nurses. This analysis did not, however, focus on acquiring nurses for a Labor and Delivery unit in a civilian hospital. Rather, the unit considered was located within the National Naval Medical Center, an institution whose charter extends far beyond that of a

comparably-sized civilian institution. Above all else NNMC is a Navy hospital, with responsibilities far beyond those of any civilian facility. Like all Navy hospitals, NNMC has a wartime contingency role. This role includes preparing military staff members for world-wide deployment in support of or for duty with the operational forces. The hospital also serves as a stateside receiving and treatment site for military members who have sustained combat-related injuries. It is a training-ground for staff destined to serve overseas. NNMC also offers a "home port" for nurses and other medical department staff between tours of temporary additional duty or permanent assignment to overseas facilities or isolated hospitals in the United States.

Intertwined with these diverse functions are those relating to maintaining an active duty force, such as recruitment and retention, training, promotion opportunity, cadre requirements, force structure, and rotation. The Navy requires new people to replace those who leave, and these new staff generally need to be trained. The organization also needs, and its

personnel expect, a career ladder. This means that members have to move from job to job and place to place to progress up the ladder.

The expenses associated with these functions are the inevitable and necessary cost of doing business in any large organization. They are also the inherent costs of maintaining an armed force ready for world-wide deployment.

Despite the higher apparent cost, the officers of the Navy Nurse Corps are integral to the ability of the medical department to meet its widespread and diverse missions. As noted by the United States House of Representatives (1985):

A trained, ready and prepared military medical system is a top priority item in any discussion of readiness of our military system. Without a means to care for our fighting forces, the United States loses its credibility with the American people, our adversaries, the military commander, and most importantly, the troops themselves (p. 90).

An interesting point surrounds the issue of augmenting the NNMC Labor and Delivery staff with

active duty nurses. Overall, Navy nurses are the most costly source of additional registered nurses for the task. However, active duty salaries are paid from a central source and not by individual commands, such as NNMC. Active duty nurse salaries are a direct expense for the Navy, but not for NNMC. From the parochial perspective of the command, Navy Nurse Corps are therefore the least costly source of registered nurses. Civilian contract nurse salaries are paid directly from the NNMC budget, and are direct expenses for the command. The most expensive overall alternative thus becomes the least costly to the command.

Some individuals interviewed for this study expressed the belief that contract nurses were being employed because it was difficult to hire civil service nurses. In the 12 months from May 1990 to May 1991, NNMC hired 40 civil service registered nurses. Review of the General Schedule Special Salary Table for Series 610 registered nurses shows that the base salary for GS-11 Labor and Delivery nurses ranges from \$36,301 to \$ 45,634. This compares very favorably with prevailing salaries paid to experienced Labor and Delivery nurses

in area hospitals according to the Director of Patient Care Services at a local women's specialty hospital (C. Biggs, personal communication, 19 June 1991). While base salaries are similar, civilian hospitals may enjoy a competitive advantage related to general employment practices. Non-military hospitals are able to offer a variety of employment options not readily available in the military health services system, including extended shifts, part-time employment, salary in lieu of benefits, and weekend alternative scheduling. Federal employment policies preclude the more flexible options like weekend alternative, where an employee works two 12-hour shifts every weekend in return for 40 hours pay.

Salary is certainly a major factor in any work setting, but the flexibility to offer a multitude of employment options may be responsible for civilian hospitals being considered more competitive than federal facilities. Civilian hospitals have, and exercise, the option of paying a full 80-hour salary to nurses who work six 12-hour shifts (72 hours total work). Federal employees on these extended hours must,

in contrast, work an additional 8-hour shift to obtain 80 hours pay.

The NNMC is an attractive work setting. It is the President's hospital, the flagship of Navy medicine, and a premier teaching facility. Since the wage structure is generally competitive, factors other than salary must inevitably be considered in evaluating any reported or perceived difficulty in hiring employees such as registered nurses.

Hospital commanding officers can use their manage-to-payroll authority to adjust the civilian personnel mix, but this process is often cumbersome and subject to Department of Defense civilian hiring constraints. It is possible for a commanding officer to be on the verge of hiring a civilian nurse with funds previously allocated to clerical staff, only to encounter a hiring freeze mandated by higher headquarters. Similarly, billet reductions are periodically imposed, even when existing manage-to-payroll authority would otherwise allow staff to be hired.

For these and similar reasons, contracting for additional staff is an attractive option.

Recommendations

The findings and observations from this study hold several implications for future research, including the following.

First, the list of factors identified as being relevant to the economic analysis may be incomplete. Perhaps other factors could be isolated for inclusion in future studies. The NNMC staff who were interviewed for this analysis seemed willing to comment on the issue of cost-effective staffing methodologies. These and other individuals may be an excellent source of first-hand information for investigating other variables not addressed in this paper.

Second, a finding of interest from this study concerns manage-to-payroll authority (MTPA). Although medical treatment facility commanding officers can adjust their civilian personnel mix, use of more costly contract staff may be the only option available once the MTPA financial ceiling is reached. An attempt could be made to reprogram contract dollars into the civilian personnel MTPA accounts to allow access to additional civil service employees, a less costly

source of staff. Any reprogrammed funds should be "fenced" to preclude diversion of these moneys to other-than-personnel projects.

Third, this study draws attention to the relative scarcity of job advertising done by NNMC. The National Naval Medical Center is an appealing employer, yet local nurses in search of employment may not be aware of this. An expanded personnel advertising budget may be beneficial to the command, providing access to a more extensive group of potential employees. Further exploration of programming additional advertising funds is definitely warranted.

Fourth, the conclusion that the Navy Nurse Corps officers represent the most costly source of registered nurses will undoubtedly raise additional questions, including some centering on potential cost savings based on substitution of civilians for military nursing positions in Navy hospitals. The use of military staff involves political and readiness factors as well as economic ones. A follow-on study focusing on the role of the Navy Nurse Corps vis-a-vis overall military preparedness may be appropriate.

Fifth, research for this study indicated that Title 5 of the United States Code has been the only hiring authority available for use by Navy hospitals. Other federal agencies, notably the Veterans Administration, use hiring authority stipulated in other portions of the United States Code. As military hospitals gain access to this hiring authority through joint ventures with the Veterans Administration, it would be timely and appropriate to investigate the relative advantages and disadvantages of the various options. Factors for analysis include differences in salary tiers, leave policies, within grade pay raises, merit pay, promotion opportunities, and, undoubtedly, others. Hiring new staff using other-than-Title 5 is not yet an issue at Navy hospitals, yet commands would benefit by being prepared to address the merits and pitfalls of these potentially competing systems of employing civilian personnel.

Finally, after examining the system in which care is obtained by and provided to military health services beneficiaries, one cannot escape the observation that the primary focus is restoration of function rather

than disease prevention or health promotion. Civil engineers classify their actions into several categories when referring to maintenance, among these are "preventive" and "breakdown" maintenance. Preventive maintenance keeps equipment operating at full capacity, and periodic tune-ups assure continued function. Breakdown maintenance is just what is implies; equipment is overhauled only after it fails, at far greater expense than if routine maintenance had been performed. The military health services system exists to provide for and maintain the health of the active duty force. Huge sums of money are allocated to doing this, in the case of NNMC over \$100 million annually. Given this expenditure and the mission of the medical department, it would seem appropriate to examine the potential benefits to be derived from focusing on preventive and prospective activities.

Although there are times when political or ideological considerations preclude the introduction of economic analysis into the decision-making process, there is no doubt that cost analysis techniques should

or are being used at NNMC. The NNMC staff, whether providing direct care or supporting the patient care infrastructure, understand the need to husband their resources wisely. The potential for increased use of economic analysis in this section of the public arena is bright. Studies such as this brim with opportunities to see theory put into practice, and bring to fruition our potential for learning.

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